OXYHYDROGEN STEAM GENERATOR

TITLE OF THE INVENTION: Oxyhydrogen Steam Generator.

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BACKGROUND OF THE INVENTION AND PRIOR STATE OF THE ART

Steam is water that has been changed into gas and is at least 100 degrees C (212 degrees F.), the boiling point of water. Steam at a temperature much higher than the boiling point is called superheated steam. Steam is produced by boiling water. Although water remains at 100 degrees C until it all turns to steam, it absorbs a large amount of heat in undergoing this change. This heat is released when the steam cools and changes back to liquid water.

Steam is used as a means of transferring heat from an external source, such as the burning of coal, wood, or natural gas, to a place where this energy is needed. For example, steam is used to drive turbines that extract heat from the steam and use some of this energy to turn generators for the production of electricity. Steam is also commonly used in heating buildings, in chemical processing, and in sterilizing food. Sometimes steam is used for cooling buildings.

Boiler is a container in which a liquid is heated and changed into a vapor. Boilers change water into the vapor steam. It changes from vapor to liquid form as it delivers heat for some useful purpose, giving off even more heat as a result. Some heating systems, called hydronic systems, circulate hot water rather than steam. However, the heat source in these systems is still referred to as a boiler. Steam produced in boilers is also used in steam turbines and for refining oil or drying paper. Boilers must be strong enough to hold the high pressures inside them without bursting. They are constructed carefully and tested before they are used.

Boilers used for heating buildings operate at 10 to 15 pounds per square inch. Small power plants have boilers that operate at 100 to 250 pounds per square inch. In electric power stations boilers operate at much higher pressures.

Sizes of Boilers. Boilers in large electric power stations may be taller than a 10-story building. These boilers may produce over 1 million pounds of steam an hour. Enough coal to fill a railroad car must be burned each hour to produce this much steam.

Boiler Water Treatment. The water contains impurities. Some of these impurities cause corrosion and weaken the boiler. Others cause a layer of solid scale to form on the inside of the boiler tubes. The scale reduces the transfer of heat through the tube so that the tube metal becomes overheated. Care must be taken to remove air and other dissolved substances from water supplied to the boiler. Other substances added to the water react chemically with those already in the water to prevent scale.

It is the object this invention to enhance the state of the art that relates to boilers for generating steam by a process of internal combustion of Hydrogen and Oxygen. Steam is produced void of atmospheric emissions with minimum loss of thermal energy from body of the boiler.

SUMMARY OF THE INVENTION

In an Oxyhydrogen Reactor, Hydrogen and Oxygen are proportionally fed on the basis of stokiometric quantities to burn with an open flame at a pressure in excess of the chamber pressure. Heat generated by said flame is transferred to a membrane that serves as a separation from the water, condensate or steam that is circulated in the reactor chamber. Steam forms by heat transfer to said medium to produce steam with added energy. Steam generated transposes to combine with the steam generated by the products of combustion that develops a uniform mass of steam in a condition of higher energy than injected into the reactor chamber.

Reactor internals and combustion chamber comprises corrosion resistant materials and linings to contain the process fluids. Combustion chamber membrane is subject to ultra sonic vibration to diffuse deposition of solids on membrane surface. Also electronic charges are used to prevent salts deposition. Feed water is treated and deionized to remove all mineral deposits. Chemicals are added to control pH and prevent scaling and impurities deposits. Structural

components have provisions for expansion and reactors and can be staged in series parallel combinations for maximum flexibility for energy output requirements.

Alternately, Hydrogen can be burned with air and Oxygen rich air generated on site. Hydrogen Peroxide is also used for combustion and power enhancement. Air is compressed for suitable entry in reactor chamber. Air entrained in steam is heated and used with steam for useful work. Air and gases are separated from the condensate by gas separators.

BRIEF DESCRIPTION OF THE DRAWING

Referring to the figure, a diagram is shown representing a typical arrangement of equipment to produce steam very efficiently.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

This invention calls for a system that develops an isolated oxyhydrogen flame 1 in flame chamber 11. Hydrogen is supplied from tank 2 in pipes 3 when valve 4 is open. Flow is automatically controlled by valve 5. Valve 6 is a gas back flow preventer and spark arrestor. Oxygen is supplied from tank 7 in pipes 8 when valve 40 is open. Flow is automatically controlled by valve 45. Valve 48 is a gas back flow preventer and spark arrestor. The stokiometric amounts if Oxygen and Hydrogen gases are introduced in the oxyhydrogen torch 9. The torch 9 is sealed in flame chamber 11 surrounded by membrane 10. Steam is supplied from steam chest 47, with temperature gage 43 and pressure gage 42 through pressure reducing valve

12 and piping 13 introduced into the reactor vessel 14, through nozzles 15 and 44, in the space between the reactor vessel 14 and the flame chamber 11 to cool the screen fabric 10 that is the flame barrier of the flame chamber. By cooling the screen fabric 10 the circulating steam or water absorbs the energy of the combustion of Hydrogen and Oxygen. To generate power steam the circulating steam in the annular space inbetween the interior perimeter of the reactor chamber and the membrane 10 combines with the products of combustion to blend into a uniform steam cloud and exit at a higher pressure and temperature through base through flow unit 31 check valve 16 auto valve 17 and shut off valve 18. Power is extracted from steam chest 47 to outlet 32 and pressure relief valve 41. Capacity is controlled by regulating the flow of Hydrogen and Oxygen flow and pressure control to adjust the size of the flame 1, with corrosponding regulation of recirulating steam and water. Pressure relief valves 19 and 38 automatically releases excess steam when the pressure in the reactor vessel increases beyond a predetermined value. Pressure gage 20 and temperature sensor 21 monitor pressure and temperature in reactor vessel. The reactor vessel 14 has a lid 22 and flange 23 and gasket 24 attached with bolts 25. It also has a stand 26 and is covered with insulation 27. Automatic controls protect the membrane 10. Thermocouples 29 sense membrane surface temperatures and regulate Oxyhydrogen flame output and steam flow to protect the membrane from becoming too hot. Also steam supply to further cool flame chamber 11 cone at the venturi point is regulated by automatic valve 28 to internally cool the membrane. Drain valve 46 is used to drain reactor vessel 14. Lower flange assembly 39 contains sight glass 37 is used to observe the flame for manual adjustments or resetting automatic controls.